Belimo's EF Spring Return Actuators Serve as Economical Alternative to MS41xx Series Actuators

Heavy-duty HVAC applications can wreak havoc on electrical equipment; and at a large solid waste incineration plant in the Cincinnati Metropolitan Sewer District (CMSD), where mechanical failures can lead to costly downtime, that's exactly what was happening.

Though the entire CMSD treatment facility was commissioned in the mid-1950s, the solid waste incineration structure was built much later and did not become operational until January of 2012. The four-story building relies on 250 air dampers to provide ventilation to a large room containing the incinerators. Actuators control the dampers, which open and close automatically when atmospheric conditions in the room reach a certain temperature. When the plant was built, 250 MS41xx actuators (175 in-lbs torque) were installed to operate the air dampers, but shortly after the plant became operational, the actuators began to fail; causing the dampers to become inoperable.

Originally, plant officials began to swap out the dysfunctional MS41xx Series actuators with new units but after multiple failure incidents occurred over the course of 2012, it was determined that the actuators – which were only NEMA-2 rated – were not capable of withstanding the harsh environmental conditions that they were exposed to. Although the actuators were located inside and louvers (both intake and exhaust) were present on all of the dampers, storms that produced driving rain often left the units exposed to water. It was also thought that the presence of moisture in the air (not related to precipitation) played a key role in the failure incidents as well.

In an effort to find a solution, operations staff at the Cincinnati Metropolitan Sewer District contacted the actuator manufacturer and asked that they send a representative to the plant to examine the situation. A representative came to the facility and met with plant officials along with the mechanical contractor (Valley Refrigeration) and the supplier (Progress Supply) to determine the most appropriate course of action. Upon further inspection, it was decided that because the MS41xx Series actuators were not designed to operate in such damp conditions, they would have to be replaced with a more robust, reliable product.

Since the actuator manufacturer does not produce a model of actuator that could adequately meet the demands of the solid waste incineration facility, the Cincinnati Sewer District was forced to explore a number of different alternatives. In addition to finding a viable solution that could operate in harsh environmental conditions, plant executives sought to replace the MS41xx actuators with a more sustainable option that could cut

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energy consumption and provide added economical value over the remaining lifetime of the facility.

During the replacement process, a number of different actuators were examined and after careful consideration the decision was made to replace the failing units with Belimo's EFX120-S N4 spring return actuators. In addition to having a NEMA-4 rating, Belimo's EF actuators offered higher torque (270 in-lbs) in a single direct-coupled unit, and because of this, only 150 actuators were required to do the work that the 250 MS41xx units originally did (one EF unit can effectively operate a 66 sq-ft damper). The cost for the more robust EF actuators was almost equal to the cost of ordering 250 M-Series actuators.

The amount of time and manpower that would be necessary to actually remove the M-Series actuators and replace them with a higher torque alternative was also a concern during the replacement process. However, this quickly proved to be a non-issue as the intuitive design of Belimo's EF actuators allowed the mechanical contractor to utilize existing linkages and brackets. This simplified the installation process and replacement of all 250 MS41xx actuators only ended up taking about one month to complete.

Since the installation of Belimo's EF spring return actuators in March of 2013, the air dampers at the solid waste treatment facility have performed flawlessly. No failures or mechanical breakdowns have occurred and as a result, maintenance expenditures have virtually dropped to zero. In addition, the total power consumption associated with the EF actuators is approximately 82% less than what it was with the MS41xx actuators — equating to over $4700 in energy savings every year.

Belimo worldwide: www.belimo.com

BELIMO Americas
USA Locations, 43 Old Ridgebury Road, Danbury, CT 06810
Tel. 800-543-9038, Fax 800-228-8283, marketing@us.belimo.com

1049 Fortunato Loop, Sparks, NV 89436
Tel. 800-987-9042, Fax 800-987-8875, marketing@us.belimo.com

Canada Locations, 5845 Kennedy Road, Mississauga, Ontario L4Z 2G3
Tel. 866-805-7089, Fax 905-712-3124, marketing@us.belimo.com

Latin America and the Caribbean Customer Service
Tel. 203-791-8396, Fax 203-791-9139, marketing@us.belimo.com

Belimo Brasil Comércio de Automação Ltda.
Tel: 55 11 3643-5656, Fax: 55 11 3643 5657, atendimentoaocliente@br.belimo.com.

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